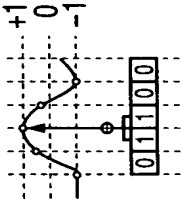
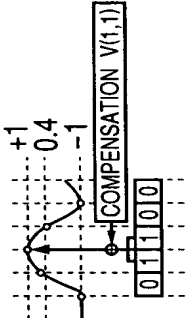
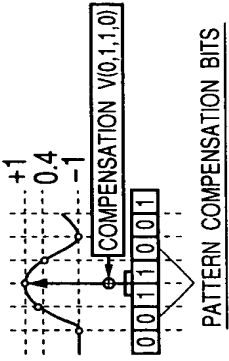

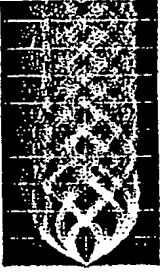
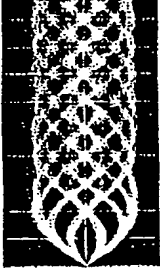
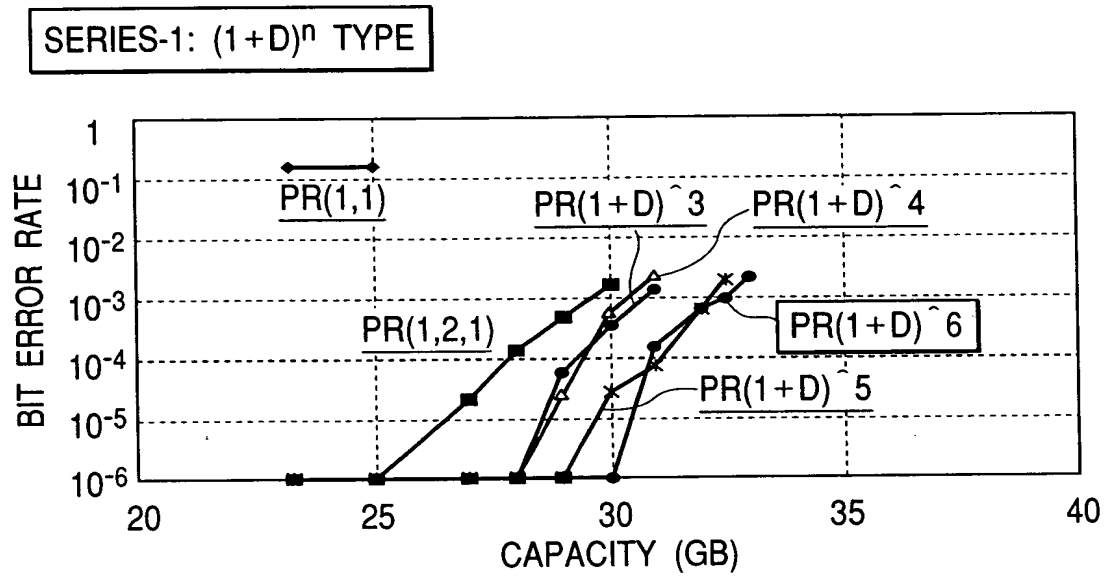
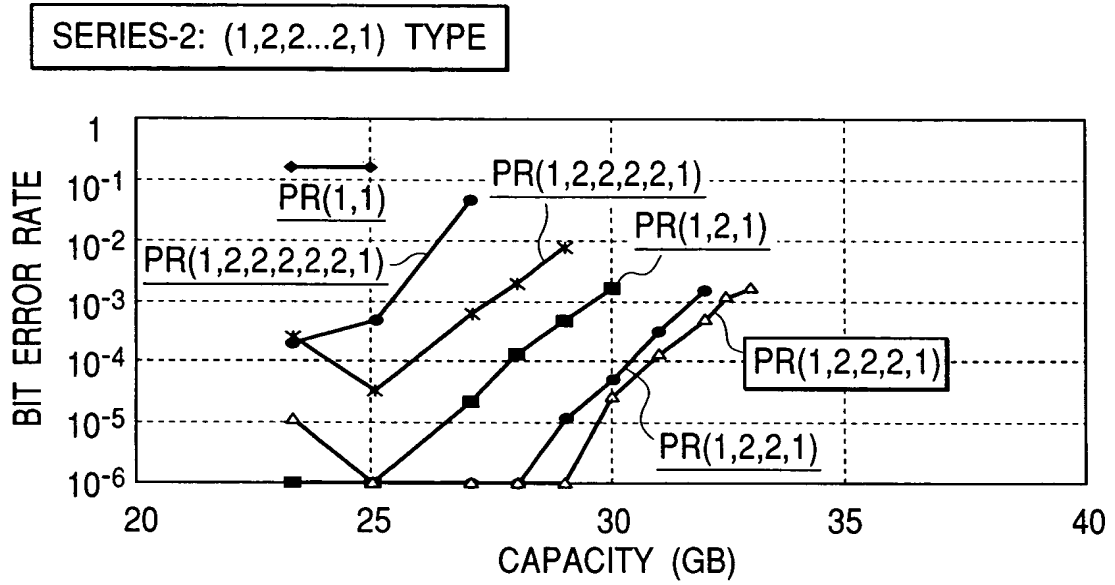


FIG. 1

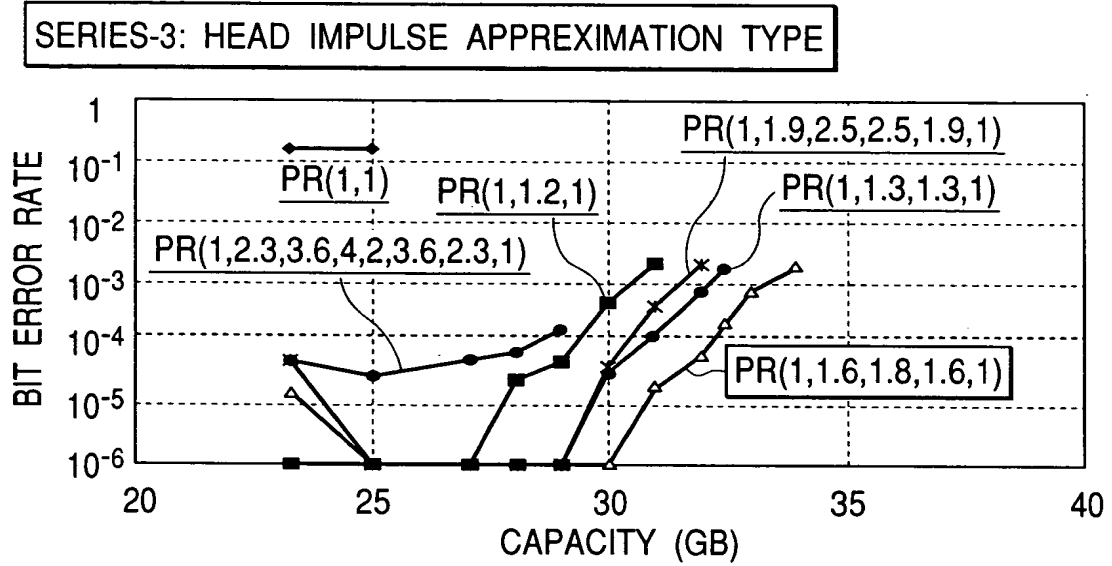
	METHOD-1	METHOD-2	NEW METHOD
MAIN FUNCTION	CONVENTIONAL (METHOD)	COMPENSATES ASYMMETRY	COMPENSATES NON-LINEAR SHIFTS
CONFIGURATION PR(1,1)			
NUMBER OF LEVELS	3	3	3
PATTERN COMPENSATION BITS	0	0	$2(=1+1)$
NUMBER OF COMPENSATION VALUES (V)	0	$4(=2^2)$	$16(=2^4)$
FUNCTION	ASYMMETRY	○	○
	INTER-SYMBOL INTERFERENCE	×	○
EXPERIMENTAL RESULTS $T_w = 57\text{nm}$ 100Mbps			
	BIT ERROR RATE = $50 \times 10^{-4}$ $2T \text{ S/N} = 3.6\text{dB}$	BIT ERROR RATE = $15 \times 10^{-4}$ $2T \text{ S/N} = 6.1\text{dB}$	BIT ERROR RATE $< 0.05 \times 10^{-4}$ $2T \text{ S/N} = 9.5\text{dB}$

**FIG. 2A****FIG. 2B**

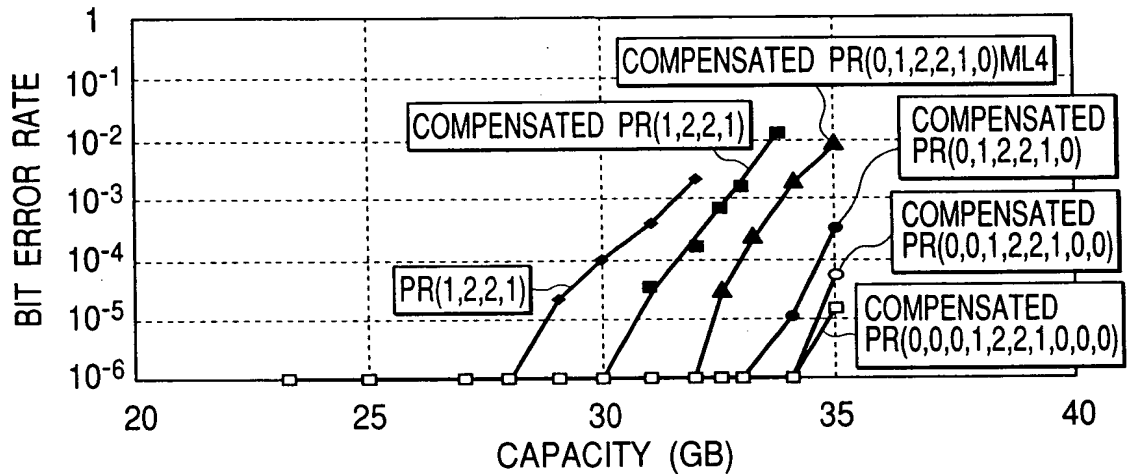
CLASS-BIT	CLASS EXPRESSION	BIT-ARRAY	NUMBER OF STATUS	NUMBER OF LEVELS	CAPACITY (GB)
2	(1,1)	4	2	3	<<23
3	(1,2,1)	6	4	4	<28
4	(1,3,3,1)	10	6	7	<29
5	$(1+D)^4$	16	10	10	<29
6	$(1+D)^5$	26	16	15	<31
7	$(1+D)^6$	42	26	22	<31

**FIG. 3A****FIG. 3B**

CLASS-BIT	CLASS EXPRESSION	BIT-ARRAY	NUMBER OF STATUS	NUMBER OF LEVELS	CAPACITY (GB)
2	(1,1)	4	2	3	<<23
3	(1,2,1)	6	4	4	<28
4	(1,2,2,1)	10	6	7	<30
5	(1,2,2,2,1)	16	10	9	<31
6	(1,2,2,2,2,1)	26	16	11	<25
7	(1,2,2,2,2,2,1)	42	26	13	<23

**FIG. 4A****FIG. 4B**

CLASS-BIT	CLASS EXPRESSION	BIT-ARRAY	NUMBER OF STATUS	NUMBER OF LEVELS	CAPACITY (GB)
2	(1,1)	4	3	3	<<23
3	(1,1.2,1)	6	4	4	<28
4	(1,1.3,1.3,1)	10	6	7	<31
5	(1,1.6,1.8,1.6,1)	16	10	10	<32
6	(1,1.9,2.5,...)	26	16	15	<30
7	(1,2.3,3.6,...)	42	26	22	<27

*FIG. 5A**FIG. 5B*

CLASS EXPRESSION	NUMBER OF BIT-ARRAY	NUMBER OF STATUS	NUMBER OF LEVELS	COMPENSATION BITS	ML BIT
PR(1,2,2,1)	10	6	7	0	4
COMPENSATED PR(1,2,2,1)	10	6	10	4	4
COMPENSATED PR(0,1,2,2,1,0)ML4	26	6	26	6	4
COMPENSATED PR(0,1,2,2,1,0)	26	16	26	6	6
COMPENSATED PR(0,0,1,2,2,1,0,0)	68	42	68	8	8
COMPENSATED PR(0,0,0,1,2,2,1,0,0,0)	178	110	178	10	10

**FIG. 6A**

RLL(1,7)  
PR(1,2,2,1)  
MARK = LOW LEVEL

NO.	BIT ARRAY	TARGET LEVEL	RLL ERROR
0	0 0 0 0	1.00	
1	0 0 0 1	0.67	
2	0 0 1 0	0.33	×
3	0 0 1 1	0.00	
4	0 1 0 0	0.33	×
5	0 1 0 1	0.00	×
6	0 1 1 0	-0.33	
7	0 1 1 1	-0.67	
8	1 0 0 0	0.67	
9	1 0 0 1	0.33	
10	1 0 1 0	0.00	×
11	1 0 1 1	-0.33	×
12	1 1 0 0	0.00	
13	1 1 0 1	-0.33	×
14	1 1 1 0	-0.67	
15	1 1 1 1	-1.00	

**FIG. 6B**

BIT ARRAY NUM = 10  
STATE NUM = 6  
TARGET LEVEL NUM = 7

NO.	BIT ARRAY	TARGET LEVEL
0	0 0 0 0	1.00
1	0 0 0 1	0.67
2	0 0 1 1	0.00
3	0 1 1 0	-0.33
4	0 1 1 1	-0.67
5	1 0 0 0	0.67
6	1 0 0 1	0.33
7	1 1 0 0	0.00
8	1 1 1 0	-0.67
9	1 1 1 1	-1.00

**FIG. 7A**

RLL(2,10)  
PR(3,4,4,3)  
MARK = LOW LEVEL

NO.	BIT ARRAY	TARGET LEVEL	RLL ERROR
0	0 0 0 0	1.00	
1	0 0 0 1	0.57	
2	0 0 1 0	0.43	×
3	0 0 1 1	0.00	
4	0 1 0 0	0.43	×
5	0 1 0 1	0.00	×
6	0 1 1 0	-0.14	×
7	0 1 1 1	-0.57	
8	1 0 0 0	0.57	
9	1 0 0 1	0.14	×
10	1 0 1 0	0.00	×
11	1 0 1 1	-0.43	×
12	1 1 0 0	0.00	
13	1 1 0 1	-0.43	×
14	1 1 1 0	-0.57	
15	1 1 1 1	-1.00	

**FIG. 7B**

BIT ARRAY NUM = 8  
STATE NUM = 6  
TARGET LEVEL NUM = 5

NO.	BIT ARRAY	TARGET LEVEL
0	0 0 0 0	1.00
1	0 0 0 1	0.57
2	0 0 1 1	0.00
3	0 1 1 1	-0.57
4	1 0 0 0	0.57
5	1 1 0 0	0.00
6	1 1 1 0	-0.57
7	1 1 1 1	-1.00

**FIG. 8**

RLL(1,7)  
COMPENSATED PR(1,2,2,1)  
MARK = LOW LEVEL

NO.	BIT ARRAY	RLL(1,7) PR(1,2,2,1)	RLL(2,10) PR(3,4,4,3)		
		INITIAL TARGET	INITIAL TARGET	RLL ERROR	RLL COMPENSATION VALUE
0	0 0 0 0	1.000	1.000		0.000
1	0 0 0 1	0.667	0.571		-0.095
2	0 0 1 1	0.000	0.000		0.000
3	0 1 1 0	-0.333	-0.143	×	∞
4	0 1 1 1	-0.667	-0.571		0.095
5	1 0 0 0	0.667	0.571		-0.095
6	1 0 0 1	0.333	0.143	×	∞
7	1 1 0 0	0.000	0.000		0.000
8	1 1 1 0	-0.667	-0.571		0.095
9	1 1 1 1	-1.000	-1.000		0.000

*FIG. 9*

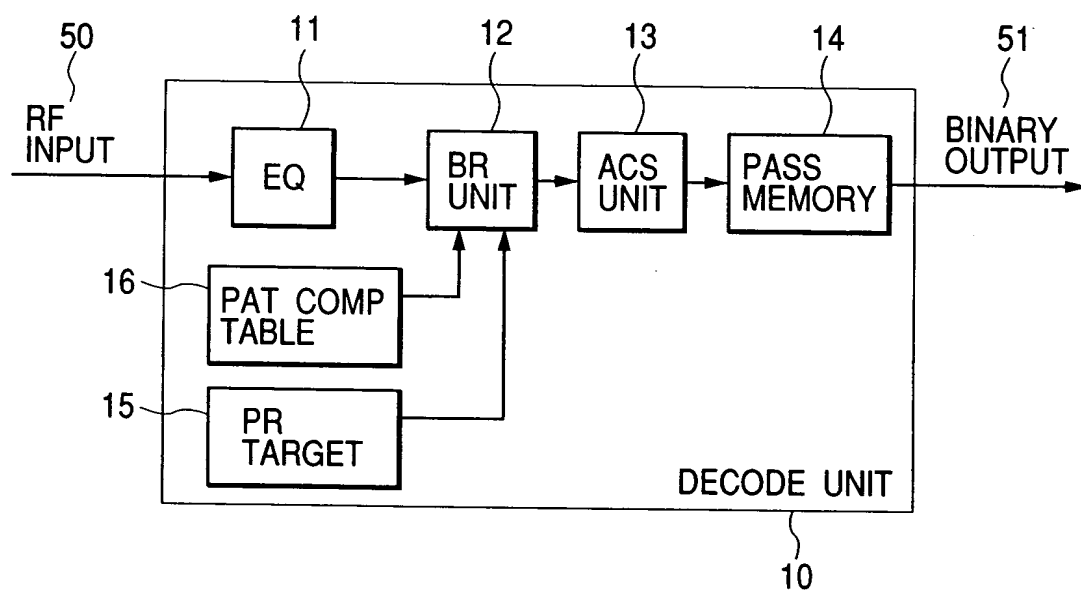
RLL(1,7)  
 COMPENSATED PR(1,2,2,1)  
 MARK = LOW LEVEL

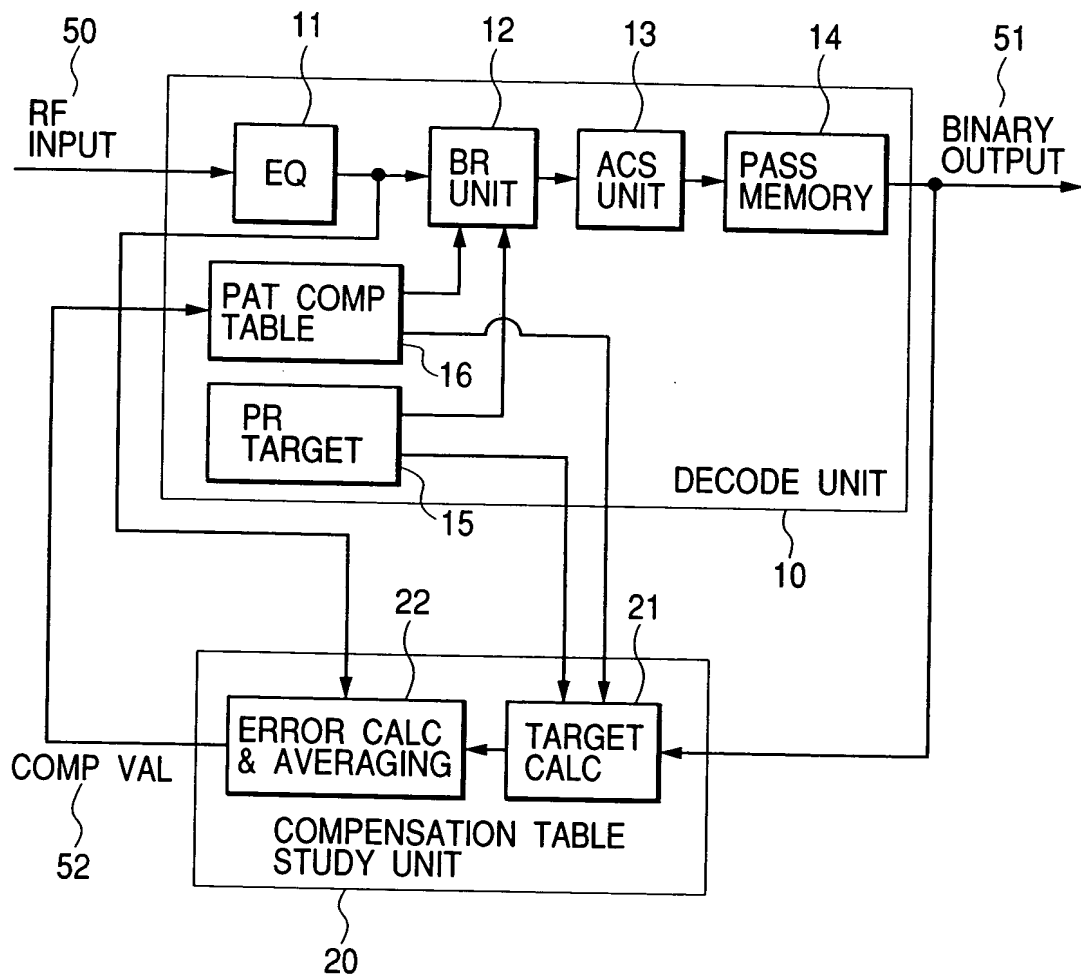
NO.	BIT ARRAY	INITIAL TARGETS	COMPENSATION VALUE	COMPENSATION TARGET
0	0 0 0 0	1.000	0.180	1.18
1	0 0 0 1	0.667	-0.145	0.52
2	0 0 1 1	0.000	-0.051	-0.05
3	0 1 1 0	-0.333	0.276	-0.06
4	0 1 1 1	-0.667	0.094	-0.57
5	1 0 0 0	0.667	-0.145	0.52
6	1 0 0 1	0.333	-0.372	-0.04
7	1 1 0 0	0.000	-0.050	-0.05
8	1 1 1 0	-0.667	0.076	-0.59
9	1 1 1 1	-1.000	0.090	-0.91

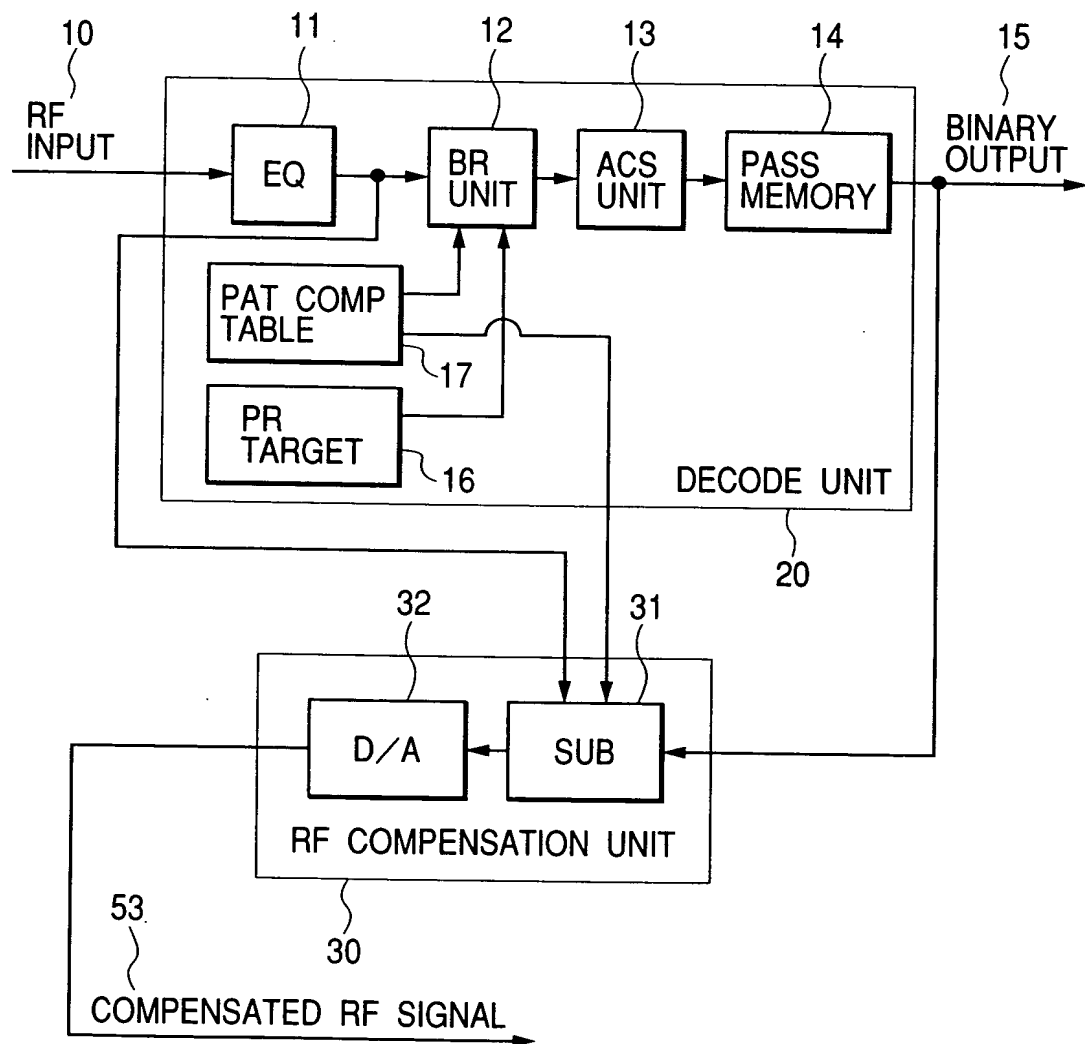
**FIG. 10**

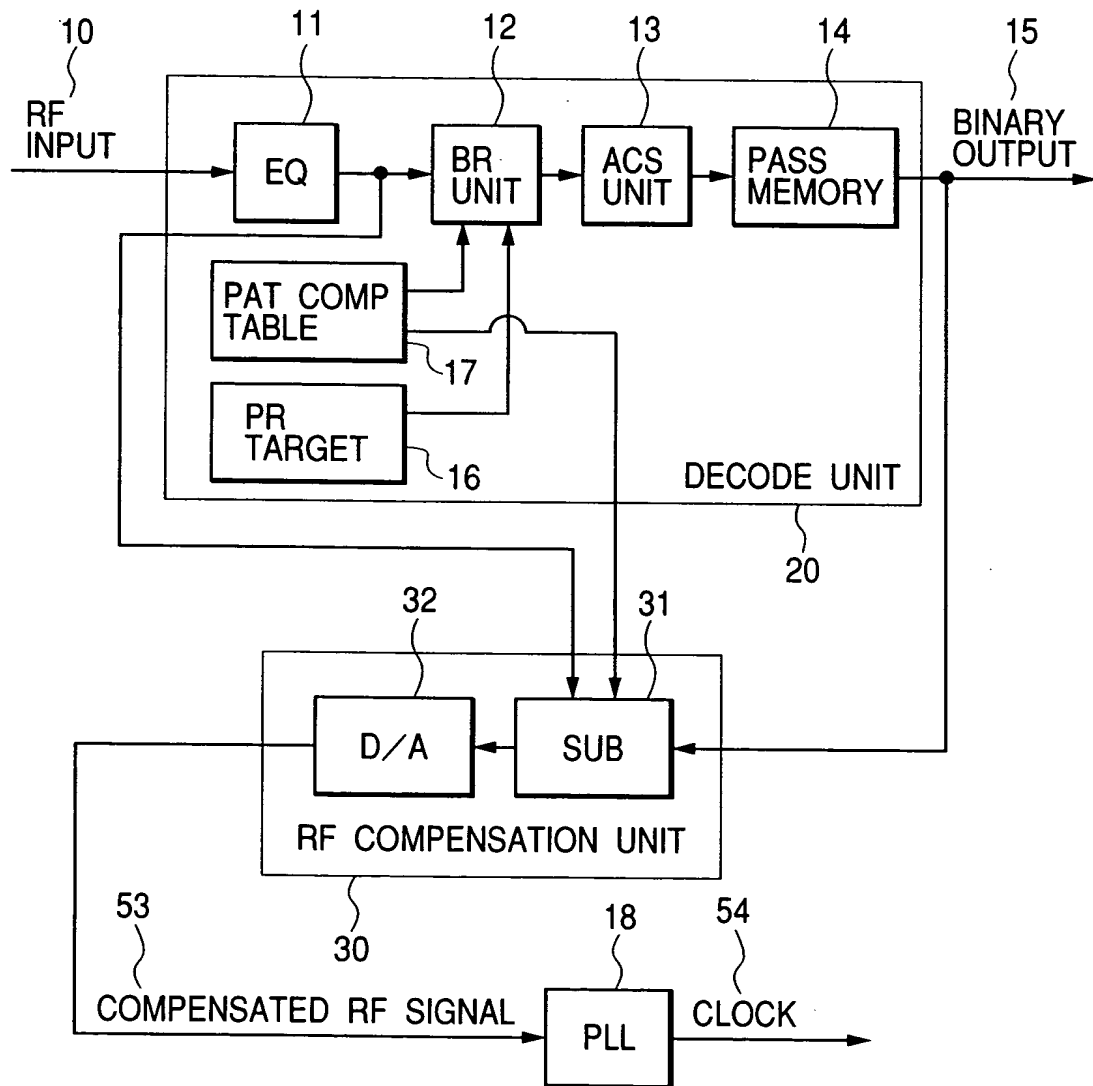
RLL(1,7)  
 COMPENSATED PR(0,1,2,2,1,0)  
 MARK = LOW LEVEL

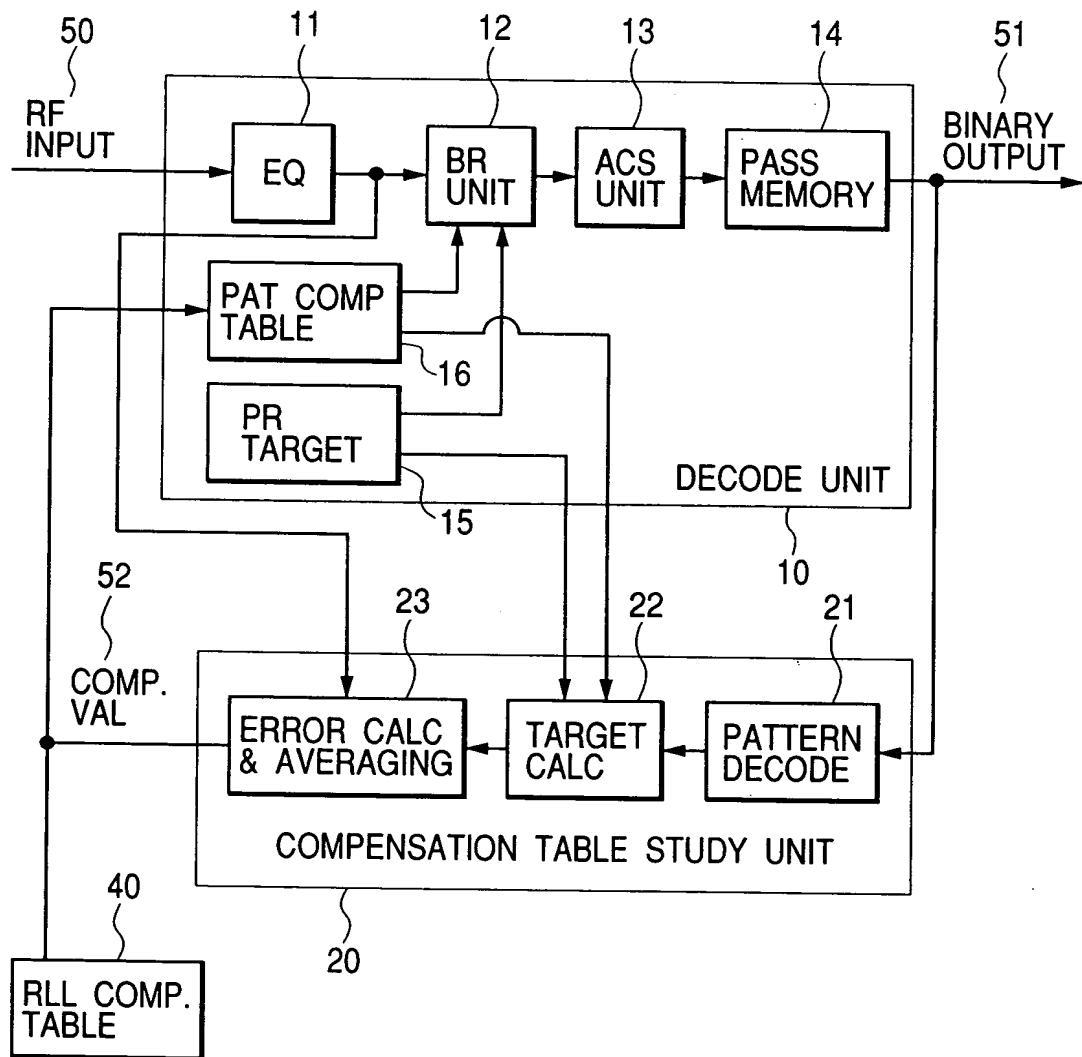
NO.	BIT ARRAY			INITIAL TARGET PR(1,2,2,1)	COMPENSATION VALUES (6 BITS)	COMPENSATED TARGETS
	COMPENSATION BIT	PR(1,2,2,1)	COMPENSATION BIT			
0	0	0 0 0 0	0	1.00	0.494	1.494
1	0	0 0 0 0	1	1.00	0.203	1.203
2	0	0 0 0 1	1	0.67	-0.026	0.641
3	0	0 0 1 1	0	0.00	0.129	0.129
4	0	0 0 1 1	1	0.00	-0.056	-0.056
5	0	0 1 1 0	0	-0.33	0.276	-0.057
6	0	0 1 1 1	0	-0.67	0.128	-0.539
7	0	0 1 1 1	1	-0.67	0.077	-0.590
8	0	1 1 0 0	0	0.00	0.133	0.133
9	0	1 1 0 0	1	0.00	-0.019	-0.019
10	0	1 1 1 0	0	-0.67	0.137	-0.530
11	0	1 1 1 1	0	-1.00	0.121	-0.879
12	0	1 1 1 1	1	-1.00	0.118	-0.882
13	1	0 0 0 0	0	1.00	0.494	1.494
14	1	0 0 0 0	1	1.00	0.203	1.203
15	1	0 0 0 1	1	0.67	-0.026	0.641
16	1	0 0 1 1	0	0.00	0.129	0.129
17	1	0 0 1 1	1	0.00	-0.056	-0.056
18	1	1 0 0 0	0	0.67	-0.145	0.522
19	1	1 0 0 0	1	0.67	-0.145	0.522
20	1	1 0 0 1	1	0.33	-0.372	-0.039
21	1	1 1 0 0	0	0.00	0.133	0.133
22	1	1 1 0 0	1	0.00	-0.019	-0.019
23	1	1 1 1 0	0	-0.67	0.137	-0.530
24	1	1 1 1 1	0	-1.00	0.121	-0.879
25	1	1 1 1 1	1	-1.00	0.118	-0.882

*FIG. 11*

*FIG. 12*

**FIG. 13**

**FIG. 14**

**FIG. 15**

**FIG. 16**

RLL(1,7)  
COMPENSATED PR(0,1,2,2,1,0)  
MARK = LOW LEVEL

NO.	BIT ARRAY						RLL(1,7) COMPENSATED PR(0,1,2,2,1,0)		RLL(2,10) PR(3,4,4,3)		
							INITIAL TARGETS	COMPEN- SATION VALUES	INITIAL TARGETS	RLL ERROR	RLL COMPEN- SATION
0	0	0	0	0	0	0	1.000	a	1.000		0.000
1	0	0	0	0	0	1	1.000	b	1.000		0.000
2	0	0	0	0	1	1	0.667	c	0.571		0.095
3	0	0	0	1	1	0	0.000	d	0.000	x	∞
4	0	0	0	1	1	1	0.000	e	0.000		0.000
5	0	0	1	1	0	0	−0.333	f	−0.143	x	∞
6	0	0	1	1	1	0	−0.667	g	−0.571		−0.095
7	0	0	1	1	1	1	−0.667	h	−0.571		−0.095
8	0	1	1	0	0	0	0.000	i	0.000	x	∞
9	0	1	1	0	0	1	0.000	j	0.000	x	∞
10	0	1	1	1	0	0	−0.667	k	−0.571		−0.095
11	0	1	1	1	1	0	−1.000	l	−1.000		0.000
12	0	1	1	1	1	1	−1.000	m	−1.000		0.000
13	1	0	0	0	0	0	1.000	n	1.000		0.000
14	1	0	0	0	0	1	1.000	o	1.000		0.000
15	1	0	0	0	1	1	0.667	p	0.571		0.095
16	1	0	0	1	1	0	0.000	q	0.000	x	∞
17	1	0	0	1	1	1	0.000	r	0.000	x	∞
18	1	1	0	0	0	0	0.667	s	0.571		0.095
19	1	1	0	0	0	1	0.667	t	0.571		0.095
20	1	1	0	0	1	1	0.333	u	0.143	x	∞
21	1	1	1	0	0	0	0.000	v	0.000		0.000
22	1	1	1	0	0	1	0.000	w	0.000	x	∞
23	1	1	1	1	0	0	−0.667	x	−0.571		−0.095
24	1	1	1	1	1	0	−1.000	y	−1.000		0.000
25	1	1	1	1	1	1	−1.000	z	−1.000		0.000

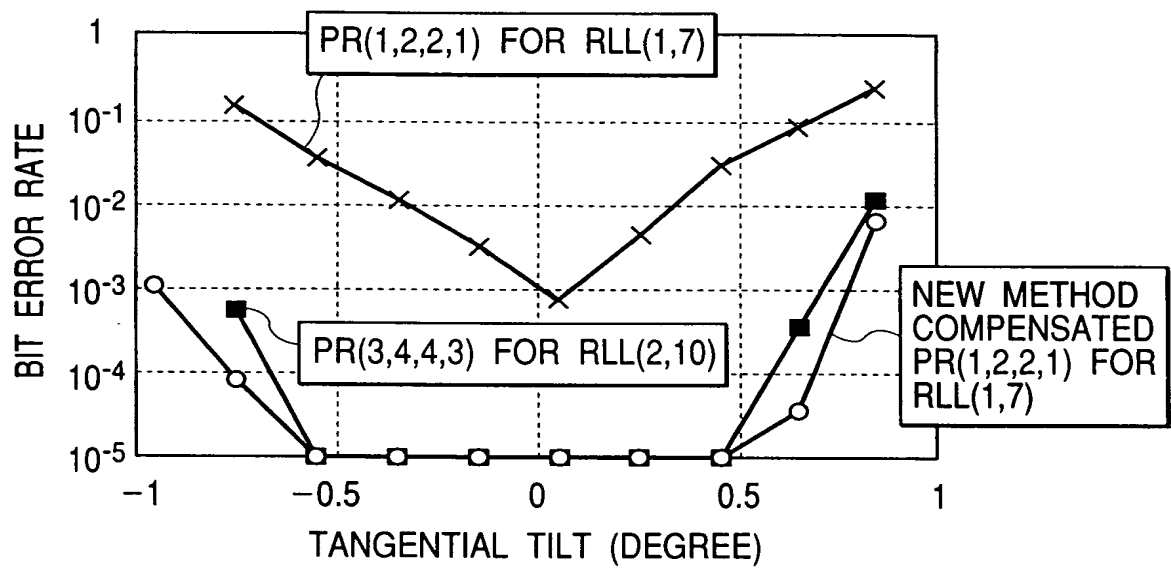
*FIG. 17*

FIG. 18

